Answers to Numerical Questions

Chapter 1

Gas laws

3 54.27 cm^3
4 23.81 cm^3
5 14.35 cm^3

Additional questions

8 214.6°C

Chapter 5

Calculating moles

1a 0.10 mole
b 0.16 mole
c 2 moles

2a 3.20 g
b 160 g
c 5.75 g

3a 0.10 mole
b 1 mole
c 10 moles

4a 162 g
b 8.50 g
c 55.83 g

5a 0.08 mole
b 10 moles
c 0.0008 mole

6a 7.20 dm^3
b 2.40 dm^3
c 48 dm^3

7a 2 mol dm^{-3}
b 0.20 mol dm^{-3}

8a 7.98 g
b 40.40 g

Calculating formulae

1 CaO
2 Empirical formula = CH_3
Molecular formula = C_2H_6

Moles and chemical equations

1 32 g
2 320 g
3 127 g
4 24 dm^3
5 500 cm^3
6 0.27 mol dm^{-3}

Additional questions

1a (i) 71 g
(ii) 72 g
b (i) 74 g
(ii) 8.5 g

2a 300dm^3
b 3.60 dm^3

3a 0.0015 mole
b 6 moles

4 SiO_2

5a CHO_2
b $C_2H_20_4$

6d 448 tonnes

7a VuCI

8c 0.002 mole
d 48 cm^3
e 40 cm^3

Chapter 6

Calculations in electrolysis

2a 2 faradays
b 1 faraday
c 3 faradays
d 2 faradays

3a 193000 coulombs
b 96 500 coulombs
c 193000 coulombs

4 0.2 faradays

Additional questions

4 27971 s (466.18 min)
5 216 dm^3
6 0.15 faradays

Chapter 7

Crystal hydrates

1a 36.07%
b 62.94%
c 36.29%

Solubility of salts in water

1a 24.2 g per 100 g of water
b 18.5 g per 100 g of water
c 32.4 g per 100 g of water

3a 56.5 g per 100 g of water
b 73.8 g per 100 g of water
c 102.3 g per 100 g of water

4a 17.3 g (± 0.50 g)
b 45.8 g (± 0.50 g)
c 28.5 g (± 0.50 g)

5 6.25 g (±0.50 g)

Titration
1 0.19 mol dm^{-3}
2 0.18 mol dm^{-3}

Additional questions
4c 2.33 mol dm^{-3}

6b (i) 34.0 g per 100 g of water
41.0 g per 100 g of water
65.0 g per 100 g of water
90.0 g per 100 g of water
(ii) 31.0 g (± 0.50 g)
(iii) 7 g (± 0.50 g)

8e (i) 51.22%
(ii) 0.07 mole of water
0.01 mole of magnesium sulphate
(iii) $MgSO_4.7H_20$

Chapter 8

Additional questions
5e (iii) 2.40 dm^3
8a 110 tonnes

Chapter 9

Additional questions
6c (i) 4.8 tonnes
(ii) 9.2 tonnes

8c 1590 tonnes

Chapter 10

Additional questions

1b (i) 42.9 cm^3
(ii) 21.45%

5c 28720 s (or 478.67 min)
d (ii) 103 400 tonnes

6a 184 000 tonnes
b 3.09×10^{12} dm^3

7a 4.4×10^{10} dm^3

Chapter 11

Surface area

2c 26 cm^3 (± 0.5 cm^3)
d 1 min 51 s (± 3 s)

Additional questions

2f 46 s(± 1 s)
g 43 s (± 1 s)

4g 12 min

6c 0.309 g

7e (i) 6.16 g
(ii) 3.36 dm^3
(iii) 13.44 dm^3

Chapter 12

Alkanes

1a 98.5°C
b 126°C

Other uses of alkanes

2a 1 mole CH_4 : 1 mole Cl_2
b 1 mole CH_4 : 4 moles Cl_2

Alkenes

a 54°C

Additional questions

7a CH
b C_6H_6

Chapter 13

Chemical energy

1a -1161 kJ mol^{-1}
d ethanol 25 kJ
heptane 49.5 kJ

2a 364 kJ
b 3640 kJ
c 182 kJ

3a 114 kJ
b 14.25 kJ
c 114 kJ

Additional questions

1b (i) -1461 kJ mol^{-1}
4b (iii) -114 kJ
c (iii) 143.75 kJ

5a 0.50 g
b 10080 J
c 10.08 kJ
d 20.16 kJ
e 46 g
f 927.36 kJ

6b 100 g
c 2100 J (2.10 kJ)
d 0.05 mol
e 42000 J (42 kJ)

8d (i) 110 g
(ii) 1110 kJ
(iii) 555 kJ
(iv) 185000 kJ

Chapter 14

Biotechnology

2a whisky/brandy: 400 cm^3
b 35%
350 cm^3
C 16 litres (drn')

Additional questions

5d (i) 363 kJ
2904 kJ
90.75 kJ
(ii) 12 dm^3

Chapter 15

Artificial fertilisers

1 Ammonium nitrate: 35.00%
Ammonium phosphate: 28.19%
Ammonium sulphate: 21.21%
Urea: 46.67%

Additional questions

4a Sodium nitrate: 16.47%
Potassium nitrate: 13.86%
e 39.38 kJ

5d (i) 32%

(ii) 19%
e 25%

6a 10.25 10.1 10.1 10.15
b 10.12 cm^3
c (ii) KOH: 1 mole
HNO_3: 1 mole
d (i) 0.0038 mole
(ii) 0.0038 mole
e 0.37 mol dm^{-3}

Chapter 16

Additional questions

3b 7.5 tonnes
c 15 tonnes
d 5.6×10^6 dm^3

4b (i) 5%
(ii) 31%
d (i) 3×10^6 tonnes
(ii) 550000 tonnes
(iii) 900000 tonnes

6b 0.01 mole
c 0.005 mole
d 0.2 mol dm^{-3} (or 0.2 M)